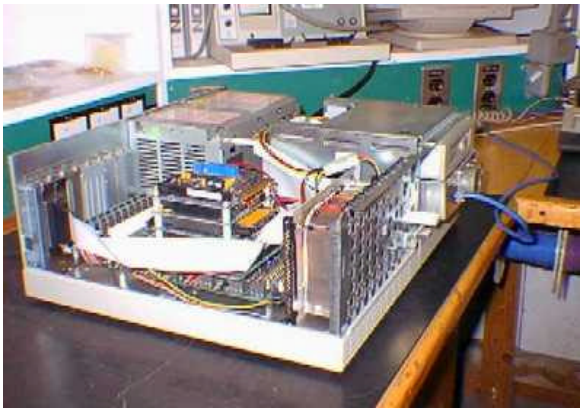
TRANSPORTATION RESEARCH
BULLETIN
A Publication of Idaho Transportation Department Research

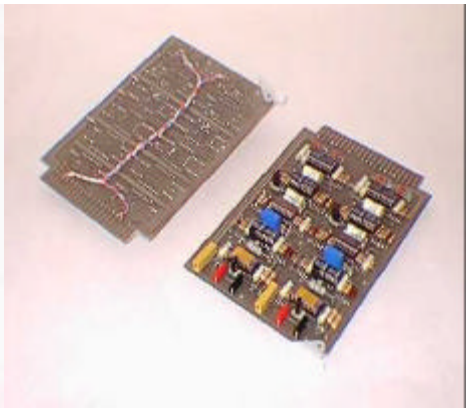
Vol. 1, No. 3 Spring 1998

Micro-Strain Development Investigation on Track

Background:

Mitch Latta from Headquarters Traffic Section is spearheading a project to further develop micro-strain technology as an extension of work that he had previously done with the support of other Department staff. It involves the development of an integrated database using micro-strain technology to support WIM, vehicle identification, vehicle detection, etc. Initial prototype hardware has been developed under Phase 1. The current Phase 2 project will finalize the research on algorithms and software as well as the development of the prototype hardware for fourteen analog subsystems. This project involves a new technology, which could result in a new type of sensor costing about 10 percent as much as piezo-electric sensors





Major Sub-systems:

The left photo illustrates the **DIGITAL DATA ACQUISITION SUB-SYSTEM** with which the signals generated by the passing vehicles are initially analyzed, and minimally pre-processed. The center photo illustrates the **ANALOG/FILTER SUB-SYSTEM** through which the data from the transducers is initially passed. A typical three-transducer-per-lane installation may be utilized for vehicle classification, as well as medium accuracy weigh-in-motion. This system is comprised of up to four each **Two Channel Amplifier/Filter** printed circuit boards as illustrated in the right photo. These two sub-systems along with their respective power supplies are housed in the instrumentation cabinet located alongside the travelway at the site.

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NEW PUBLICATIONS AVAILABLE

FHWA-ITD-RP121-I, Vol. I, Development of a Mechanistic-Based Overlay Design System, Vol. I - FLEXOLAY Program Documentation

FHWA-ITD-RP121-I, Vol. II, Development of a Mechanistic-Based Overlay Design System, Vol. II - FLEXOLAY Program User Manual

FHWA-ITD-RP124-1, Monitoring and Modeling Subgrade Soil Moisture for Pavement Design and Maintenance in Idaho, Phase 1: Development of Scope of Work

FHWA-ITD-RP125, ITD Update of Winter Maintenance Complement Prediction Model

FHWA-ITD-RP130, Statewide and Sub-area Transportation Model Feasibility Study

Micro-strain Development (Cont. from Page I, Col. 1)

From the site the data is fed to the **ANALYSIS/ SERVER SUB-SYSTEM** located at an office, where the data analysis is completed and the results are stored for network distribution to the users.

Applications Identified:

Mitch indicates that about 15 applications involving engineering data acquisition and processing have been identified so far for this technology. These include:

Digital:

- Bicycle Detection
- Wheel Chair Detection
- Motorcycle Detection
- Automatic Pedestrian Detection
- Zoned Movement Detection

Analog:

- Vehicle Signature Analysis
- Vehicle Classification
- Vehicle Weight-In-Motion
- Vehicle Tracking on Closed Campus for Process Control
- Pavement Sub-grade Characterization Investigations
- Pavement Characterization Investigations
- Impact Loading on Structures and Joints

Other:

- Snow Slide Detection
- Earth and Building Seismic Movement Detection
- Low Cost Railroad Crossing Signal Detection System

Status of Development:

Hardware Development: Most of the analog sub-system amplifier/filter printed circuit boards passed through the "GO/NO-GO" testing. The environmental testing will be conducted later this year, just prior to field installation. The analog cases are complete. The cable assemblies are back from fabrication, and will undergo testing during assembly of the cases/cable assemblies/matrix panels for mounting in the instrumentation cabinets in the field. The digital data acquisition sub-system is nearly fabricated.

Specifications for a contract to commercially fabricate, locally, any additional equipment needed for future systems are being developed. This will allow commercial availability of all sub-systems of the Engineering Data Acquisition System.

Software Development: Development of the software for the digital data acquisition sub-system will begin later this summer. The data analysis/server is configured, and networked, but the analysis algorithms have yet to be developed.

Implementation: Headquarters Traffic Section and District. #3 Design Section personnel have been coordinating their efforts to ensure proper site preparation and a decision unit for communications equipment in the rebuild of the **Emerald Street/I-184 Connector Overpass** site. This will require that two or three drawings be developed for the construction contract; one of which will be the standard detail for transducer installation at 3+ lane sites.

Development of the cabling matrix panel is ongoing for installation of the analog and digital sub-systems at the **Micron Technology** site, the **SH-21 Boise River Bridge** site, and when needed, the new **I-184 Connector** site. This is the assembly that provides for the interconnection of the field cabling with the analog sub-assembly, the digital data acquisition sub-assembly and for these with the communications and power sub-assemblies.

Public Showing: The first public showing of the project occurred this past month at the **Idaho Transportation Consortium's** presentations of ongoing research. As a result, the FHWA offered to assist in funding certain aspects of the project during the coming fiscal year.

Experimental Projects Involve Practitioners in Research

Classes of Research:

By Definition, research is concerned with the advancement of knowledge. Many classifications have been defined, but for purposes of orienting the quest for knowledge or solving of problems, research can be basically divided into the following types:

- **Theoretical or Basic Research** - A systematic investigation endeavoring to obtain a fuller knowledge of natural or socioeconomic phenomena.
- **Applied Research** - A systematic investigation to learn how knowledge can be applied to the solution of a problem.
- **Development Studies** - A study to translate knowledge or research results into materials, devices, or techniques for the practical solution of a specific problem.
- **Evaluation Studies** - A study to measure, test, and evaluate the performance of new developments under operating conditions.
- **Other Studies** that do not fit into any of the above classifications may, in fact, be research. These can be the collection of data on practices, procedures of similar activities, or the demonstrations and improvement of new devices or techniques.

Experimental Projects generally fall into the last two classes.

Categories Defined by FHWA:

Construction projects that incorporate experimental features financed by federal funds fall under the requirements of Federal-aid Policy Guide, Section G 6042.4. It provides for three categories of projects:

- **Category 1** - Construction projects incorporating an approved SPR study financed with SPR funds where provision is made for tests, measurements, instrumentation, observation, analysis, and reporting.

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Materials Lab Receives Certification

Effective May 1,1998, the Central Materials Laboratory was fully accredited by AASHTO. Idaho is now one of only 20 State DOT's to be accredited in all four major areas. These include **Soils**, **Asphalt Pavement, Concrete** and **Hydraulic Cement**.

The accreditation process began with the submittal of the **Criteria Compliance Document** on June 3, 1997. This was followed by the scheduling of two inspections by the **AASHTO Materials Reference Laboratory (AMRL)** and one by the **Cement and Concrete Reference Laboratory (CCRL)**. These inspections covered 54 AASHTO and 18 ASTM test procedures performed by the labs. Following receipt of the three Inspection Reports, minor modifications to some of the test procedures were required, as well as the modification or replacement of outdated test equipment.

All personnel in the labs are to be commended for their perseverance in achieving the level of excellence required for accreditation. It is in keeping with the Department's ongoing process to improve quality.

GPR Survey of Pavement Thickness Evaluated by BSU

Background:

Knowledge of pavement layer thickness is needed to predict pavement performance, establish load carrying capacities and develop maintenance and rehabilitation priorities. In addition, for new construction, it is important to ensure that the thickness of materials being placed by the contractor is acceptably close to specification. However, core sampling and test pits are destructive to the pavement system, expensive, time consuming, and intrusive to traffic. The ground-penetrating radar (GPR) systems provide a relatively low-cost and reasonably reliable alternative to coring.

In 1995 through 1996, the Idaho Transportation Department conducted a series of GPR surveys to determine its reliability as a nondestructive testing

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Experimental Projects Involve Practitioners (Cont. from Page III, Col. 1)

- **Category 2** - Construction projects incorporating experimental features, which normally require a minimum of advance planning, with moderately controlled conditions and without instrumentation, where observations are limited to a visual comparison between experimental and control sections. These could include demonstration type features involving items unique to present construction methods and practices. Category 2 projects must be cleared with the Division Administrator of the Federal Highway Administration before the work is undertaken. For control purposes, the Materials Section will assign a project number. This number will be six digits: i.e. 94 - 04 - 43 or 94 - 12 - 16. The first two digits specify the year the project started. The second two digits represent the sequential project number. The last two digits indicate the section or district that is responsible for the project. Federal research funds may only be used for evaluation of these projects, not construction or maintenance.

- **Category 3** - A plan describing the objectives of the demonstration and the means by which the objectives are to be met.

Of the 67 experimental projects undertaken by the Department since 1969, sixty-five have been Category 2 projects and two have been Category 3. Consistent with the Department's overall research program, projects having a high probability of early payoff in contributing to the solution of specific and important problems being experienced by the Department are selected in order to make the best use of the limited research funds available

Variety of Projects Initiated:

To date, thirteen different offices or Districts have sponsored experimental projects. Twenty-one projects were initiated at Headquarters. These include Bridge Design - one, Construction - three, Maintenance - one, Materials - eight, Roadway Design - 2, Traffic - two, and the Transportation Board - four. Forty-six projects were initiated at the District level. Sponsorship ranges from three projects by District One to eighteen projects by District Three. A few examples are given below.

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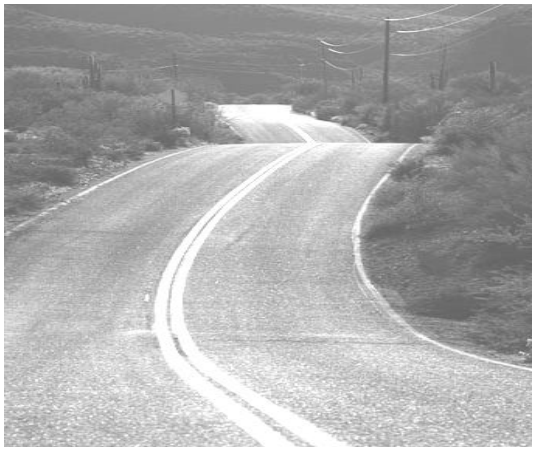
GPR Comparison (Cont. from Page III, Col. 2)

(NDT) method for evaluating the thickness of asphalt and portland cement concrete (AC/PCC) pavements in Idaho. The GPR surveys employed both air-coupled (A-C) and combination air-ground-coupled (A-G-C) systems with their associated equipment and software. A total of 30 miles of AC/PCC pavements were evaluated by GPR surveys. The results obtained were correlated with the site-specific ground-truth data from borings.



Objectives of BSU Study:

The Boise State University College of Engineering (BSU) was contracted by ITD to evaluate the effectiveness of GPR as a NDT method component of a highway pavement, structural evaluation system in Idaho. This included a comparison of the ability of these two GPR systems to nondestructively measure accurately the thickness of multiple pavement layers and document the resulting data. BSU's study reviews the findings of these surveys and provides statistically based data for both AC and PCC pavements.

Preliminary Conclusions:

The study has shown that reasonably accurate and dependable determinations of the pavement surface course (AC/PCC) can be achieved using a normal driving-speed data collection method by either A-C or A-G-C based GPR NDT systems. The results indicate that, for both systems, project level surveys provide a higher quality and more accurate data in comparison to the network level GPR surveys. Results of base course thickness measurement from both the project and network level GPR surveys indicate that both GPR technologies are capable of providing similar results. However, the reported base course thickness values appear to deviate significantly from the GTD.

Web Sites Address the Year 2000 Problem

Year 2000 Questions to Ask

The Federal Highway Administration has identified a number of questions that transportation agencies need to address concerning the impact of the Year 2000 Bug on their operations. These include:

- Has the organization completed an assessment of Year 2000 compliance for all its information systems, data communications systems, and operational transportation systems?
- Does this assessment include "embedded processors," i.e., computer chips that are part of traffic signal systems, traffic management systems, bridges with moveable spans, and other transportation-related systems?
- Does the organization have a comprehensive Year 2000 program underway that assigns Year 2000 responsibilities and will ensure Year 2000 compliance for all information systems, data communications systems, and operational transportation systems?
- Has the organization provided sufficient resources for their Year 2000 program and are their efforts to renovate, validate, and implement Year 2000 compliant systems on schedule? On what date will all critical systems be Year 2000 compliant?
- Does the organization have appropriate reporting procedures to ensure that they are making sufficient

progress to meet their Year 2000 program goals?
- Have the local electronic links between FHWA division offices and their State DOT been tested for Year 2000 compliance, including links to each other's e-mail system and access to each other's information systems?

Year 2000 Web Sites

A number of governmental agencies and private enterprises have established web sites to address the Year 2000 problem. They cover a range of topics including computer hardware and software problems, testing procedures, and legal and financial implications of the problem.

♦ FHWA & the Year 2000 Computer Problem	www.fhwa.dot.gov/y2k/
♦ NIST Year 2000 Information	www.nist.gov/y2k/
♦ 2000 AD, Inc.	www.tickticktick.com
♦ ComLinks.com	www.comlinks.com
♦ ILM Corporation	www.ilmcorp.com
♦ Network Advisor	www.network-advisor.com
♦ Software Management Network	www.softwaremanagement.com
♦ Westergaard Year 2000	www.y2ktimebomb.com
♦ Y2K Links	www.y2klinks.com
♦ Year 2000 Management Briefing	www.itrain.co.uk/fry2mb.htm

NCATT Develops Software Tools

Benefits of Software Tools:

Development of software tools for the **Roadway Design** and **Traffic** sections of ITD, in addition to improving the efficiency of the Department's design processes, provides the benefit to ITD of raising awareness of design issues discovered in the course of the project design process. The detailed engineering necessary to develop these tools requires a detailed analysis of ITD processes. This in turn necessitates clarification of those processes. This clarification sometimes results in refinement of design processes in a positive direction. The combined experience and sharing of process and procedure successes and shortcomings allows staff from both the University of Idaho's **National Center for Advanced Transportation Technology (NCATT)** and ITD to become more efficient and effective in many areas of operation.

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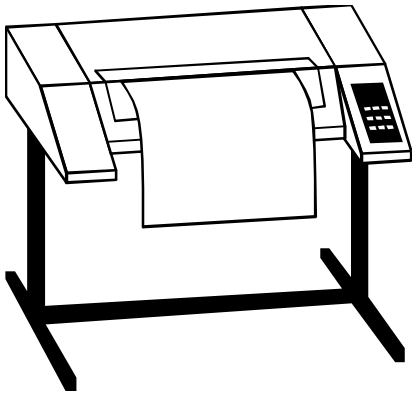
Software Tools (Cont. from Page V, Col. 2)

AutoPayItem MicroStation CADD Tool:

The **AutoPayItem** program is a pay item placement, tracking, and reporting tool used in the roadway design process. Through this software package, roadway designers can efficiently place pay items on plan sheets and track quantities, locations, and types of pay items for specific plan sheets or for the project as a whole. Use of this tool also eliminates errors often encountered when engaged in repetitious processes like those required of pay item placement and tracking.

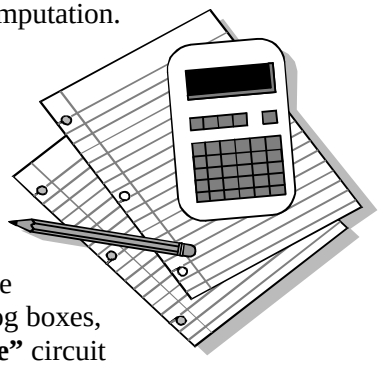
Potential errors include number transposition or mathematical computation errors. **AutoPayItem** also relieves the designer from the necessity of drawing a separate graphic for each pay item by facilitating placement of graphic symbols on plan sheets. Changes to pay items are also easily accommodated through use of this tool. Selecting the appropriate graphic element and entering the new information can easily change information pertaining to each pay item. The new information is reflected in summaries created through automatic generation of summary reports for the desired level, for both the plan sheet and the project as a whole. Because these reports are generated through software, accuracy is greatly improved and the designer is relieved from what would otherwise be a time consuming task.



Circuit_Comp Circuit Computation Tool:

Circuit_Comp is a tool used in roadway lighting and electrical circuit design applications. This tool facilitates the circuit design process by obtaining information pertaining to a particular circuit and computing the most efficient wire gauge configuration for that circuit. **Circuit_Comp** performs a best-fit analysis of the circuit through application of electrical industry circuit computation algorithms, relieving the circuit designer of the necessity of applying a trial and error approach. Use of these algorithms lends a degree of confidence that the design meets applicable standards for the type of circuit being designed while holding the potential to cut material expense in electrical circuits. At the same time, software settings allow the designer the freedom to set parameters for circuit types or individual circuits.

This program is run within the MicroStation CADD environment, simplifying the design process by eliminating the need to leave that environment to perform the circuit computation. Changes to circuit components or circuit settings are facilitated and re-computation of wire gauges or other circuit information is automatically available through standard dialog boxes, providing **"at a glance"** circuit information. These features allow the designer to perform **"what if"** analyses of circuits to analyze the effects of changes to circuit components on the circuit as a whole.



Experimental Projects Involve Practitioners (Cont. from Page IV, Col. 1)

Construction - EX69-01A-50: Short Sections of a 1968 plant mix seal were treated with both a diluted SS-1 emulsion and an oil emulsion fog seal (Reclamite) to tighten a dry mat and preserve it through the winter. The Reclamite gave the best results, so it was applied to a large portion of the remainder of the project which was completed in 1969, to see how effective the oil emulsion is as a construction seal. The project was initiated in 1969 with Federal-aid Interstate funds.

Materials - EX70-05-43: This project was designed to compare performance of a pavement with Portland Cement filler to pavements using various strengths of anti-stripping agents. Observations were made and tests run on cores for several years. The test after one year showed an increase in density and a decrease in air voids. No differences in performance developed during the seven-year test period. This project was initiated in 1970 with Federal-aid Primary funds.

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NCATT Conducts Research to Support Traffic Engineering and Planning

Several research projects are being carried out concurrently by the **National Center for Advanced Transportation Technology (NCATT)** at the University of Idaho to support traffic engineering and planning in Idaho. The results will have benefits to both the ITD and local transportation agencies.

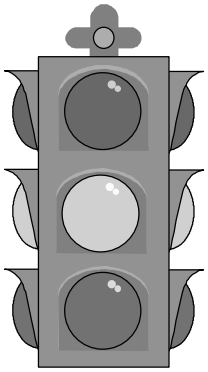
Traffic Signal Controller Interface:

Traffic signal controller interface **(AAP2LMS)** was created as a link between popular signal optimization software and signal controller software. After performing signal optimization with the Arterial Analysis Package (AAP), using either PASSER II-90 or TRANSYT-7F, **AAP2LMS** effectively translates optimized signal timings into the format of interface software for TCT traffic signal controllers or other NEMA controllers. LM System Software is the interface software for TCT models LMD 8000 and LC 8000 controllers.

If AAP and AAP2NEMA are installed on a system, as well as Microsoft Excel version 97, **AAP2LMS** can be used to translate any file group from AAP that has been optimized with PASSER II-90 or TRANSYT-7F and translated from single ring sequential to dual ring concurrent with AAP2NEMA. The formal report will include an example of this process.

Control Strategy for Signalized Intersections:

Corridor traffic signal-timing synchronization is one of the most cost-effective methods for reducing delays and improving the overall operation along for all vehicles along a congested corridor. A series of signalized traffic intersections on US-95 in northern Idaho connecting Coeur d'Alene to Hayden has generated complaints by the local motorists regarding long delays at the intersections. Traffic congestion due to the rapid population growth of Coeur d'Alene and long queuing times at critical intersections due to large number of visitors during the summer months are at the heart of these complaints. In order to provide smooth progression and fewer delays along US-95 and its cross streets; TRANSYT-7F, PASSER II-90, TEAPAC, and CORSIM models were used to study and re-coordinate the signal-timing of the existing twelve coordinated, fully-actuated controlled intersections.



The research project utilized PASSER II-90 and TRANSYT-7F to optimize progression and minimize delays, respectively, for motorists at all intersections. The PRENETSIM/TEAPAC was then used to create a preliminary input file for the CORSIM simulation model. The preliminary input file was further calibrated to reflect the field data. The simulation output of the validated CORSIM model produced many Measurements of Effectiveness (MOE). MOE such as speed, time delays, and queue length were compared among the **existing**, **applied** and **proposed** signal-timing plans. The **proposed** signal-timing plan showed significant improvements along the studied corridor.

Statewide and Sub-area Transportation Model Feasibility Study:

In this research, a feasibility study to develop an Idaho statewide transportation model was conducted. This study has constructed the foundation for developing the **Idaho Statewide Travel Demand Model**. As a result of this feasibility study, ITD has awarded phase two of this project to develop the model. The proposal for the Idaho statewide model is represented in the final section of the formal report, which is available for distribution.

The feasibility study included a review of statewide transportation models from Florida, Wyoming, Michigan, Vermont, Indiana, and Pennsylvania. A review of available transportation planning software packages was also conducted to select the most appropriate package for statewide modeling in Idaho. The research team recommended TranPlan as the package having the greatest potential.

The transportation planning efforts conducted in Idaho were also reviewed. This included a review of the metropolitan planning organizations and other urban area models as well as Idaho commodity flow. These will serve as the basis for the Idaho's statewide model. Since a transportation model requires the input of a transportation network, traffic data, and land-use data, the availability of existing digital databases was also assessed.

Experimental Projects Involve Practitioners (Cont. from Page VI, Col. 2)

Transportation Board - EX76-03-13: This was a demonstration project on the evaluation of rubber-asphalt stress absorbing membrane interlayer (SAMI). This type of seal and overlay was used to repair two badly deteriorated roadways. After a two year evaluation period, many of the pre-existing transverse cracks and nearly all the pre-existing longitudinal and alligator or ladder type cracks had not reappeared.

District 1 - EX90-03-01: The objective of this project was to evaluate the ability of Dura-Stripe to achieve a minimum four-year life on asphaltic and Portland Cement concrete pavements. Dura-Stripe was applied at both 40-mil thickness and 90-mils. Based on the results of the study, it was recommended that pavement markings in all high ADT areas should be Dura-Stripe AC. This project was initiated in 1990 with Federal-Aid Interstate 4R funds.

District 2 - EX88-05-02: This project was to evaluate, under field conditions, the concept of yielding seam pipe. The keyhole slot design allows for stress relieving in the pipe by slippage of the longitudinal joint as the embankment is placed. The objective was to provide an alternate design, which will reduce the required metal thickness, still carry the design load, and decrease the overall cost of the installation. This concept was tested in an 84-inch pipe under approximately 25 feet of fill. This project was initiated in 1988 with Federal-Aid Primary funds.

District 3 - EX77-01A-03: This project was to study the erection of long span structural plate culverts and revise the design and construction procedures to correct reoccurring erection problems. Three separate long span culverts, all manufactured by ARMCO, were installed under this research project without encountering any major problem or difficulty. This project was initiated in 1977 with Federal-aid Bridge funds.

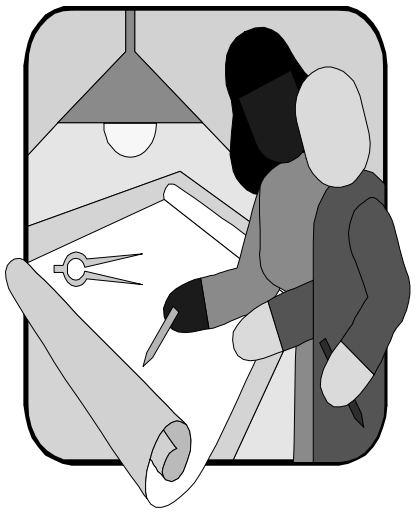
District 4 - EX77-03B-02: This project was to study the use of rubber-asphalt to prevent or retard transverse cracking. The Raft River project utilized a stress absorbing membrane (SAM) using rubberized asphalt as a seal coat. After six months of service, transverse cracks in the original pavement reflected through the stress absorbing membrane. This project was initiated in 1977 with Federal-aid Interstate funds.

District 5 - EX72-14-01: In an attempt to improve driver awareness and reduce the number of run-off-the-road accidents, randomly spaced, intermittent, full-width strips of chip seal were placed on a section of I-15 (McCammon - Inkom) that had experienced a higher than average accident and fatality rate prior to 1972. The chip seal strips were effective for two or three years and appear to have reduced the run-off-the-road accidents. This project was initiated in 1972 with Federal-aid Interstate funds.

District 6 - EX89-02B-06: The objective of this research project was to install and evaluate a railroad crossing utilizing full depth rubber crossing material made of virgin rubber manufactured by Red Hawk Rubber Company. Several type of crossing materials (full depth and partial depth reinforced materials) had been used in the past with varying results. Some failed due to vibrations and track movements, while others failed due to high traffic volumes and heavy axle loads. The subject crossing was located at a traffic signal with low speeds and approximately 7000 ADT. After four years, there were virtually no signs of damage. This project was initiated in 1989 with Federal-Aid Railroad Protection funds.

Coordination Is Important:

Experimental Projects involve the active participation and commitment of a number of personnel in order to be successful.



During the four-year life of the project, design, construction and maintenance personnel at the District responsible for constructing the project will become involved in addition to a representative of the sponsoring office. It is necessary for a tracking system to be in place to ensure the smooth hand-off of the project from its conception in design through to the maintenance function.

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Reports Are Also Important:

The various research project reports provide a means for implementing research findings into operational policies or techniques as well as helping research administrators and the Federal Highway Administration to evaluate the progress of individual studies. They also indicate whether a study is sufficiently productive to warrant continuation.

The following types of **research reports** are required:

- Initial or Construction Reports
- Annual (Progress) Reports
- Interim Reports
- Final Reports

Initial or Construction Reports: Initial or construction reports are submitted immediately following completion of the project and cover the starting of a project. On construction projects, the report should include all the problems (specifications, materials, supply, handling, and installation) connected with the project.

Annual Reports: An annual status or progress report must be submitted for the first three years following completion of the project. Annual reports for experimental features in construction (Category 2) shall document the condition of the feature or subject of experimental procedure.

Interim Reports: An interim report should be prepared at any time a study develops findings that might be implemented by the Department prior to completion of the overall study or which might suggest or provide the basis for additional, meaningful research. Interim reports should contain any data or information that will support the conclusions made.

Final Reports: The final report is required at the end of the fourth year following completion of the construction project. The report provides the link between the knowledge gained and the operational implementation of that knowledge. For construction projects, they serve as the basis for removing a feature from its experimental status. The feature then be either adopted it as a standard or rejected. The most valid and important research findings will be of little value to the Department if they are not conveyed clearly and convincingly to the person having the operational responsibility for implementing these findings.

Idaho Transportation Department Research Policy

It is the policy of the Idaho Transportation Department to encourage the advancement of knowledge through research. This research will have as its primary objectives:

- To reduce accidents and accident severity.
- To reduce the costs of design, construction and maintenance while improving the quality of the product.
- To improve the quality of service.
- To increase the efficiency of planning, operations, and administration.

The Department recognizes the benefits, which may result from research and assigns a high priority to research so these benefits may be realized at the earliest possible time. **The implementation of the knowledge gained through research is a primary goal.**

Research work may be carried out through a number of national or regional programs as well as by Department sponsored research.

National and regional programs include:

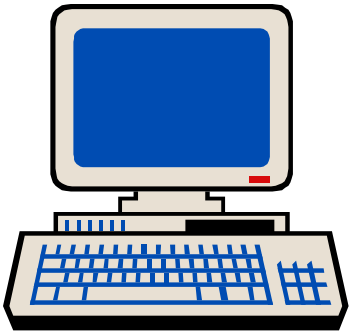
- The National Cooperative Highway Research Program (NCHRP),
- Transit Cooperative Research Program (TCRP),
- National and Regional Pooled Fund Studies,
- Special Programs such as FHWA Category 2,
- Intelligent Vehicle Highway System (IVHS), or
- Strategic Highway Research Program (SHRP).

Department sponsored research includes both a contract research program and internal research projects. Contract research may be performed by consultants, universities, or the Idaho National Engineering and Environmental Laboratory (INEEL). Department personnel may also perform research. Personnel having primary responsibility for the area of the work involved will normally staff research within the Department.

Research Web Page Goes On-Line!!!

The ITD Material Section's internal Home Page has now gone "**on-line**." It can be reached via the Transportation Department's Home Page at www2.state.id.us/itd/itdhmpg.htm. Included on the Home Page is the Department's **Research Web Page**.

The Research web page currently contains back issues of the **Transportation Research Bulletin** in PDF format. Future issues will be posted at the time of publication.



Announcements relating to the Department's research program are also posted. **Future additions** to the web page will include a **Catalog** of available research reports and **Status Reports** on current research projects.

To reach the Research web page directly, the address is www2.state.id.us/itd/materials/Research/research.htm.

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Letters or articles are welcome**.**

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